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News Bulletin of The Entomological Society of Victoria Inc.

THE ENTOMOLOGICAL SOCIETY OF VICTORIA (Inc)

MEMBERSHIP

Any person with an interest in entomology shall be eligible for Ordinary membership. Members of the Society include professional, amateur and student entomologists, all of whom receive the Society's News Bulletin, the Victorian Entomologist.

OBJECTIVES

The aims of the Society are:

(a) to stimulate the scientific study and discussion of all aspects of entomology,
(b) to gather, disseminate and record knowledge of all identifiable Australian insect species,
(c) to compile a comprehensive list of all Victorian insect species,
(d) to bring together in a congenial but scientific atmosphere all persons interested in entomology.

MEETINGS

The Society's meetings are held at the 'Discovery Centre', Lower Ground Floor, Museum Victoria, Carlton Gardens, Melway reference Map 43 K5 at 8 p.m. on the third Tuesday of even months, with the exception of the December meeting which is held on the second Tuesday. Lectures by guest speakers or members are a feature of many meetings at which there is ample opportunity for informal discussion between members with similar interests. Forums are also conducted by members on their own particular interest so that others may participate in discussions.

SUBSCRIPTIONS (2008)

Ordinary Member	$30 (overseas members $32)
Country Member	$26 (Over 100 km from GPO Melbourne)
Student Member	$18
Electronic (only)	$20
Associate Member	$ 7 (No News Bulletin)
Institution	$35 (overseas Institutions $40)

Associate Members, resident at the same address as, and being immediate relatives of an ordinary Member, do not automatically receive the Society's publications but in all other respects rank as ordinary Members.

LIFE MEMBERS: P. Carwardine, Dr. R. Field, D. Holmes, Dr. T. New, Dr. K. Walker.

Cover design by Alan Hyman.

Cover illustration: The pale Sun Moth, *Synemon selene* Klug, is an endangered species restricted to perennial grassland dominated by *Austrodanthonia* in Western Victoria. It is now extinct in SA, and was presumed extinct in Vic. until its rediscovery, in February 1991, by the late Frank Noelker and Fabian Douglas. The Victorian Populations are parthenogenetic with all specimens comprising females, a most unusual trait in the Castniidae. Illustration by Michael F. Braby.

Minutes of the General meeting 21 August 2007

Present: P. Carwardine, S. Curle, I. Endersby, M. Endersby, K. Harris, G. Weeks, P. Lillywhite,

Apologies: D. Dobrosak, P. Marriott, D. Stewart, K. Walker, L. Gibson, Melanie Birtchnell

Minutes:

Minutes of the Members Meeting [*Vic.Ent.* **37(4)**: 45] were accepted by P. Carwardine, K. Harris

Correspondence:

- Received the Australian Journal of Entomology, Volume 46, part 3, 2007.
- Received information regarding the inaugural Australian and New Zealand Biocontrol Conference 2008.
  The IOBC-APRS
  Australian and New Zealand Biocontrol Conference 2008
  Sydney Menzies Hotel, 10th - 13th February 2008. Further information at: http://www.anzbc2008.org
- Received information regarding the new publication of North American Hawk Moths by the Wedge Entomological Research Foundation. There is currently an introductory offer in place for orders before 1st November 07 of US$75.00. See http://www.wedgefoundation.org/home.html for further information.

Treasurers Report: General account $5178, Le Souëf account $4745.
18 people have yet to pay this years membership renewal.

Editors report: No information received for this meeting. Editor commended for the colour issue. More articles needed for forthcoming publications please.

General Business:

Membership

- Received nomination for new member Jill Dawson. Jill is interested primarily in insect pollinators of native plants.
- David Ferguson accepted as a member of the society.

Future Speaker: Orchid Pollinators

This was a member's open meeting and a number of presentations from the members followed. I have tried to give a flavour of these excellent presentations within these minutes, a summary follows:

Peter Lillywhite : Senior Collections Manager, Melbourne Museum

Peter brought with him a selection of Stag Beetles presented in 4 exceptionally well made cabinet drawers.

Peter explained that they belong to the family Lucanidae which includes 5 sub families, 109 genera and around 800 species worldwide (Kracjik 2001). In the New World there are 31 genera and 183 species with representatives in each of the 5 subfamilies. Most New World taxa are neotropical; in the Nearctic region there are only 24 species in 8 genera. Barry Moore suggests upward up 1,200 species and subspecies.

Peter explained that the collection of Stag Beetles that he was exhibiting were part of the Graham Krake collection donated to the museum (donated under the Cultural Gifts Program). The entire collection itself features 2600 specimens which consists of 600 species (including sub species) of the Coleoptera family Lucanidae. All of the specimens in the collection are pinned in individual cardboard unit trays, with relevant collection data, one species per cardboard unit. They are housed in glass topped museum style insect drawers with Napthalene recesses in a 30 drawer unit. The collection fills 20 of the drawers and covers 600 of said species (45 Australian). All of the specimens are in excellent condition. A detailed catalogue of the collection can be posted at your request.

As a result of this generous donation, the Museum of Victoria now has 71 of the total 95 Australian species.

Peter Carwardine: Walter Wilson Froggatt 1858-1937

Peter had brought in a selection of significant entomological publications and concentrated his presentation on those works produced by W.W. Froggatt.

Peter showed members these publications:
1907: Australian Insects - 449 pages, 39 plates, 180 text blocks. This was the first comprehensive text-book on Australian Entomology.
1923: Forest insects of Australia, 171 pages.
1927: Forest Insects and Timber Borers
1933: The Insect Book, 103 pages

Peter then gave us an insight into the life of Froggatt and indeed the number of publications and papers that he produced during his lifetime of achievements - quite remarkable. A total of 383 items including 4 books.

Ian Endersby : Aranae

Ian brought along a presentation that he had recently given at a local school in Balnnaring. Ian explained that the pupils are given assignments and then they try and get someone with specialist knowledge in the area to present to the parents - in this case Spiders.
Ian started his presentation with the most recent taxonomy of Aranae. The tree was derived by stitching together the results of 67 separate phylogenetic analyses, where overlap and agreement allowed and is all based upon morphological features as opposed to DNA.

Ian's presentation then proceeded to provide photographic illustrations of a large number of the families represented in the phylogeny of Aranae.

Next Meetings:
September: Council meeting
October: Excursion: Melbourne Zoo. More details to follow.
November: Council Meeting
December: Members' Night

Meeting closed at 21:25

Minutes of the Council Meeting 18 September 2007

Present: P. Carwardine, D. Dobrosak, I. Endersby, P. Lillywhite, P. Marriott,

Apologies: S. Curle , K. Walker

Minutes:

Minutes of the Council Meeting [*Vic. Ent.* 37(4): 46] were accepted. I. Endersby, P. Carwardine.

Correspondence:

- Received a request from the Friends of the Eltham Copper to participate in a larvae count.
- Enid Mayfield is a natural history illustrator and offered to talk to the Society on scientific illustration.

Treasurer's Report:

General account $5508, Le Souëf account $4744

10 people have yet to pay this year's membership renewal. These will be removed from the mailing list.

Editor's report:

Sufficient articles were in hand for the October issue. The Editor sought clarification on the Society's policy on use of colour images in *Victorian Entomologist*. The policy as published *Vic. Ent.* **34(5)**: 52 was reaffirmed.

General Business:

Excursion Melbourne Zoo Butterfly House:
Members and visitors are to travel to the main Zoo entrance in Elliott Avenue, Parkville, follow the left hand wall, turn into the service road, and assemble at Gate 5 at 9:45AM sharp on Saturday 13th October.

Publication project: Ian Endersby has prepared a small booklet on insect collecting techniques. It was perceived there is a demand for such a publication and Council will review this matter at the November Council meeting.

Web based checklist: A host for the web based checklist of species found within Victoria has been arranged. Details will be published when the files are finalised and uploaded.

Next Year's Program: Council members discussed possible subjects for next year's meetings.

Meeting closed at 18:25

The Chevron Cutworm, *Diarsia intermixta* (Lepidoptera: Noctuidae: Noctuinae) in Tasmania

L. HILL

Department of Primary Industies and Water, Tasmania, P.O. Box 303, Devonport, 7310, Lionel.Hill@dpiw.tas.gov.au.

Introduction

The chevron cutworm, *Diarsia intermixta* Guenée, 1852 belongs to a primarily north temperate genus which has its centre of speciation in West China. Holloway (1979) said that several species are found on mountains in the Oriental tropics and that *D. intermixta* occurred in Tasmania, southeastern mainland Australia, Norfolk Island, New Zealand, Chatham Islands, Kermadec Islands and New Hebrides. It is the only member of the genus in Australia (Nielsen et al., 1996). *Graphiphora intermixta* (Guenée, 1852) is one of eleven junior synonyms.

Because it is not regarded as a pest in mainland Australia, little has been recorded of its biology. It is a minor pest in Tasmania and the following notes collate information about its appearance, host plants and seasonality. The notes compare chevron cutworm with and to three pestiferous members of the amphipyrine genus, *Neumichtis* Hampson, 1906, namely *N. spumigera* (Guenée, 1852), *N. saliaris* (Guenée, 1852) and *N. nigerrima* (Guenée, 1852) because these often occur with chevron cutworm in mixed infestations. The common name for the three species is green cutworm.

This paper draws on the records of three Rothamsted-pattern light traps operated in Tasmania over many years; diagnostic reports by state agricultural entomologists for 20 years (1967-86) published in the 20-volume Insect Pest Survey series (for example, Martyn et al., 1971); earlier diagnostic reports held in a rearing notebook at the Department of Primary Industries and Water, Tasmania (DPIW); rearing records collected by the author 1986-2006; label data and observations of moths and immature specimens held in the collection of DPIW, Tasmania at New Town (Hobart); and other sources as cited.

Moth

The moth has a mean wingspan of 36 mm for males and 37 mm for females (range 31-40 mm, N=20, both sexes) and is 18-23 mm long with the wings in repose. The wings overlap flat on the body. There are two male colour forms, beige and orange, and one female form, which is dull purple. Both male colour forms occurred among the progeny of a single female reared in a laboratory (Hill, 1979). The adult can be distinguished from other worn Tasmanian Noctuidae in trap catches by a narrow line of pale scales along the lateral margins of the frons which coalesce anteriorly with the pale apices of the reposed, penultimate segments of the labial palps to form a pale V on the head. Black scales situated ventrolaterally on the head accentuate this pale margin.

Egg

The egg was described and figured by Hill (1982) along with those of several species of *Neumichtis* and *Proteuxoa* Hampson, 1903. In brief, it is a dome 0.46 mm high, 0.64 mm diameter bearing around 34 vertical ridges surmounted by ribs which are connected by similar horizontal cross ribs that delimit squares of smooth chorion. The eggs of *Proteuxoa* have similar ribs on the vertical ridges, cross ribs and smooth chorion. The domed eggs of *Agrotis* Ochsenheimer, 1816 and the three pest species of *Neumichtis* have vertical ridges but these do not bear ribs and the chorion of *Neumichtis* is pitted.

The egg is cream when first laid. Eggs adhere to a flat substrate in single-tiered clusters of 10-90 eggs in which each egg barely touches 3-5 neighbours. Such large clusters of domed eggs are rare among Tasmanian Noctuidae. In laboratory trials offering four artificial substrates, moths preferred to oviposit on muslin jar covers and paper towel rather than the glass walls of containers but also used waxed paper more readily than most other Tasmanian Noctuidae. Eggs require about six days incubation at 18-21°C which is typical of many Tasmanian Noctuidae held under the same conditions (Hill, 1979).

Larva

Larvae can be easily reared on a synthetic diet based on lima beans, such as is frequently used for *Helicoverpa* and *Persectania* species, to produce well formed adults (Hill, 1979).

In the key by Goodyer (undated), chevron cutworm larvae (Fig. 1) will key to the armyworm group before failing. The setae are not conspicuous and not mounted on dark sclerites. The cuticle is smooth rather than spicular or granular. Longitudinal stripes occur but are mottled and, in dark specimens, are obscure.

Figure 1. Right lateral view of sixth instar larva of chevron cutworm, *Diarsia intermixta*.

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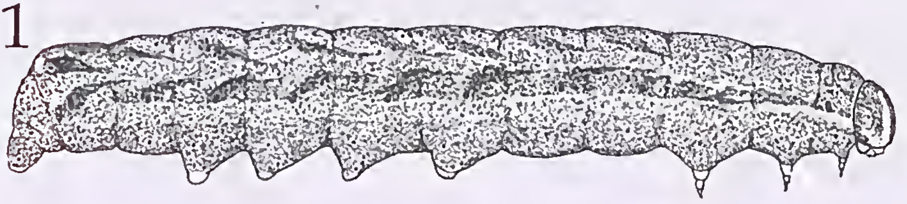


The setae of neonate larvae are long and spinous unlike *Agrotis*, whose neonate larvae bear capitate setae. The setae of mature larvae are pale, spinous and inconspicuous.

The mature larva is often almost black in the field in winter whereas pestiferous *Neumichtis* larvae are usually green. However, laboratory reared chevron cutworm larvae are paler (grey-brown) with markings as described below while *Neumichtis* larvae may be brown and superficially similar.

Chevron cutworm larvae have tiny black spots at the bases of abdominal setae rather than the small, white spots (with incomplete dark circumferences) of the three pestiferous *Neumichtis* species named above. The latter have a diagnostic, enlarged pair of white spots dorsally on A8 at the bases of D2 setae.

The spiracles of chevron cutworm are dark (brown but densely speckled with fine black marks) with black peritremes. In the three pestiferous species of *Neumichtis* the spiracles are pale brown within a black peritreme, at least in preserved specimens.

The prolegs of abdominal segments 3-6 and 10 bear 26, 26, 28, 28 and 34 crochets respectively. They do not bear black patches laterally unlike *Persectania* and *Mythimna* armyworms. The prolegs of the three pestiferous *Neumichtis* have similar crochet counts in the range 20-30 and also lack black lateral patches. *Helicoverpa, Persectania* and *Agrotis* larvae found in Tasmania have lower counts, generally below or near 20.

There are a pair of broad, darkly mottled, pale lateral bands from the first thoracic segment to the eighth abdominal segment (A8). These may include a distinctly white, narrower stripe on the thorax. The spiracles lie immediately above the dorsal margins of the bands and abdominal setae L2 lie at the ventral margins. The three, pestiferous *Neumichtis* species have similar, lateral bands.

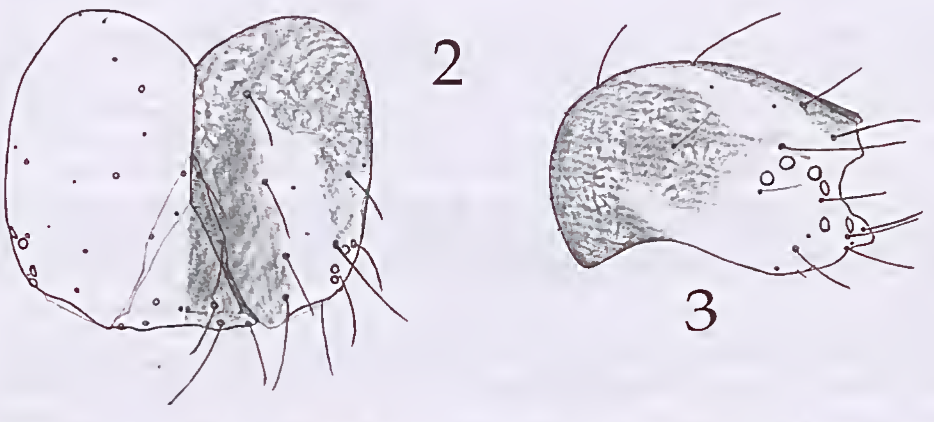
An obscure pair of broader, dark bands run subdorsally but disintegrate posteriorly where they are broken along their dorsal margins by pale, oblique intrusions from the medial, dorsal band. The dorsal margins of the dark subdorsal bands follow the line of D2 setae while their ventral margins follow the line of spiracles. A single, longitudinal, medial dorsal band defined by the line of D2 setae is paler than the subdorsal bands and intrudes into them as just mentioned.

A8 has a transverse, pale stripe on its posterior margin. A8 also bears a pair of dark, slightly oblique marks whose posterior ends adjoin the transverse pale stripe near the D2 setae. Similar but progressively less distinct dark marks occur on A7, A6 and A5. Similar dark, oblique marks occur, with variable clarity, in the three pestiferous *Neumichtis* larvae but not the pale, tranverse margin of A8.

A fourth *Neumichtis* species, *N. expulsa* (Guenée, 1852), which occasionally occurs in agricultural habitats (for example, on lettuce and carrot), has white spots at setal bases but lacks the enlarged, white spots at setae D2 on A8. It also differs from the three pestiferous *Neumicthis* species in having many, narrow, pale, dorsal longitudinal stripes (alternating with green stripes) and a well-defined, broad, lateral pair of white bands extending from the prothorax to the apices of the caudal prolegs.

On the head capsule (Figs 2 and 3) the adfrontal plates taper in the anterior third as in *Neumichtis*. They are darker than the brown frontoclypeal triangle. The adfrontal plates are bordered by a pair of dark brown bands delimited laterally by setae A2 and P2 and extending posteriorly to the margin of the capsule. This pair of brown bands is separated medially along the epicranial suture by a narrow, brown, acute triangle broken by pale muscle scar markings. Laterally to the dark brown bands is a pair of conspicuous, cream bands extending from the bases of the pale antennae to end near the P2 setae. These do not occur in the pestiferous *Neumichtis* species. The posterolateral areas of the head are dark but bear pale muscle scars. The areas near the ocelli are pale.

Figures 2-3. Chevron cutworm, *Diarsia intermixta*, head capsule of mature larva: Fig. 2, anterior; Fig. 3, right lateral.



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Ocelli 1 and 2 are separated by slightly less than one diameter, ocelli 2 and 3 by slightly more than one diameter while ocelli 3 and 4 are almost contiguous. This arrangement also occurs in the three, pestiferous species of *Neumichtis*.

The broad, sclerotised spinneret (Fig. 4) is twice as long as wide and clearly tapers whereas it is narrow in *Neumichtis*. It does not extend beyond the apices of the labial palps which is also the case in *Neumichtis*. In *H. punctigera* the spinneret is slender and much longer than the minute palps. In *Persectania ewingii* the spinneret is broad but very short while in *Agrotis munda* and *A. infusa* it is vestigial.

The mandibles (Figs 5 and 6) are mostly brown on the outer faces but have black teeth, angles and inner faces. There are five major teeth but the fifth (dorsal) is truncate and bears five, fine serrations apically. There is a large, simply acute tooth on the inner face midway along a carina that bifurcates into the first and second teeth. The preceding characters are shared with the three pestiferous *Neumichtis* species but the serration of the dorsal tooth varies and the inner tooth is serrate. In these *Neumichtis* species there is an additional but smaller, inner tooth on the adjacent, bifurcate carina but this minor tooth is absent in *N. expulsa*. The common cutworm, *A. infusa*, has 5-6 apical teeth but no teeth or bifurcate carinae on the inner faces of the mandibles.

Figs 4-6, Chevron cutworm, *Diarsia intermixta*, sixth instar larva: Fig. 4, labial spinneret, dorsal; Fig. 5, right mandible, lateral (inverted); Fig. 6, right mandible, medial. Figure 7, pupal cremaster.


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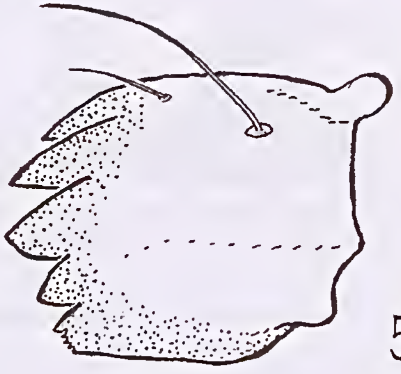
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Pupa

The pupa is brown and 16-17 mm long. The cremaster spines (Fig. 7) are similar to those figured by Hill (1981) for *Neumichtis iorrhoa* (Meyrick) and which also occur in the three, pestiferous *Neumichtis* species. That is, there are two large spines whose apices recurve laterally and four small spines that coil into a capitate apex. The gap between the bases of the large spines varies from none to one diameter in *D. intermixta*. The pupa requires 18 days (range 11-26) at 18-21°C before emergence.

Fecundity and development rate

In laboratory trials, eight moths caught in the wild and fed on a 2% sugar solution laid an average of 440 eggs with a maximum of 739 eggs from one moth. Maximum oviposition rate was 34 eggs per day and maximum female longevity was 24 days. Mean fecundity was comparable to southern armyworm, *Persectania ewingii* (Westwood, 1839) (mean 400, max 1300, n = 6 females) and *Proteuxoa sanguinipuncta* (Guenée, 1852) (mean 300, max 700, n = 10 females), a little greater than *N. nigerrima* and *N. spumigera* (means around 300 eggs for two and three females respectively) and greater than several other *Proteuxoa* species.

D. intermixta larvae developed faster than 21 other Tasmanian Noctuidae reared on a synthetic diet under the same conditions at 18-21°C. Larvae developed in 40 days (range 30-55 days, 23 larvae from two females). This was similar to *N. nigerrima* and faster than *N. spumigera*, the variable cutworm *Agrotis porphyricollis* Guenée, 1852, and *P. ewingii*, which were among the fastest of the 21 species reared (Hill, 1979). Total development time for *D. intermixta* at 18-21°C was 66 days.

Flight records

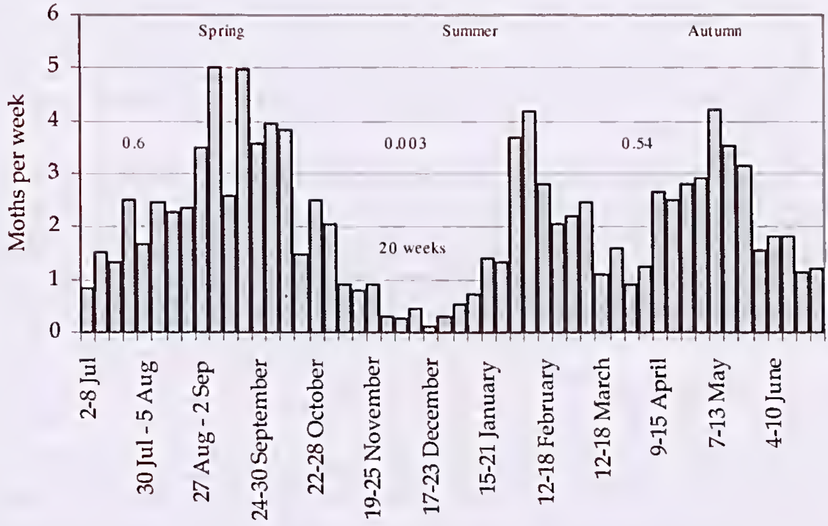
D. intermixta is a common moth in urban and agricultural ecosystems. It was among the ten most common moths trapped by Brown (1978) at Rydalmere (Sydney), NSW and by the author over 14 years at Stony Rise (Devonport), Tasmania. Primarily to forecast outbreaks of *P. ewingii*, DPIW, Tasmania operated Rothamsted-pattern light traps of uniform construction (160 W mercury vapour bulbs) in north-western Tasmania at Elliott research farm 10 km south of coastal Burnie (1955-91), at Forthside research farm 10 km west of coastal Devonport (1982-93) and at Stony Rise on the edge of suburban Devonport (1992-2006). DPIW records include chevron cutworm for the period 1977-1991 at Elliott, 1982-1993 at Forthside and 1992-2006 at Stony Rise.

The annual catches at Forthside and Elliott had means of 32 and 37 moths respectively versus 108 at Stony Rise. Although light traps vary in efficiency according to their placement the larger catches at Stony Rise may reflect the greater diversity and stability of habitats (mixed periurban and forest) around that site compared to the intensively cultivated farm-land at Forthside and mixed pastoral and cultivated farm-land at Elliott.

When plotted as weekly means for 14 years the catches of *D. intermixta* at Stony Rise have three, prolonged peaks, namely 'spring', summer and autumn with 20-, 14- and 18-week intervals following each peak respectively (Fig. 8). The 'spring' peak occupies five months including late winter. When weekly catches are examined year by year, three peaks occur most commonly (75%) but in a few years a bimodal or quadrimodal pattern occurs. Moths are active in all months but scarcest in summer.

The 20-week summer gap between flight peaks at Stony Rise cannot be explained here. It is notable because chevron cutworm completes its life cycle rapidly in the laboratory at 18-21°C and putative generational intervals in cooler seasons are 14-18 weeks (see above). Larval infestations at various localities were more frequently observed in autumn and winter than in late spring and summer so that both larvae and adults are rare in summer. Summer is the driest season at these localities. Seven correlations using Forthside monthly catch and rain data for 10 years, with time lags ranging from 0-6 months, had very low values.

Figure 8. Mean weekly catch of chevron cutworm, *Diarsia intermixta,* over 14 years in Stony Rise (Devonport, Tasmania) light trap. Correlation coefficients between consecutive peaks shown.



For the Stony Rise light trap the correlations between seasonal peaks are strong from summer to the following autumn (R^2 = 0.54, interval 14 weeks) and from autumn to the following 'spring' (R^2 = 0.6, interval 18 weeks) but weak from 'spring' to the following summer (R^2 = 0.003, interval 20 weeks).

Data from the Elliott and Forthside traps cannot be plotted at weekly intervals because it was collected at irregular intervals that often exceeded a week.

Catches from Forthside when plotted as monthly means for 10 years have one, prolonged, skewed peak from October to May. However, if a very large catch in December 1988 is excluded the mean pattern has two peaks (spring and summer-autumn) similar to Elliott as described below. In December 1988 there was a catch of 31 moths following five months of nil or unitary catches. Species that are or may be migrants from mainland Australia were associated in substantial numbers with this catch, namely the noctuid moths, *H. punctigera*, *P. ewingii*, green looper *C. argentifera* (Guenée, 1852) and *A. infusa*, and the ichneumonid wasp, *Dicamptus*. When catches are examined year by year, three peaks occur most commonly (60%).

Catches from Elliott when plotted as monthly means for 14 years have two peaks, namely spring and summer-autumn with lulls in July and November-December. When catches are examined year by year, three peaks occur most commonly (71%).

The correlation between Elliott and Forthside monthly catches for nine years (1982-90) is Forthside catch = 0.35 Elliott catch + 16, R^2 = 0.36. The ratio of standard deviation over mean for any month roughly equals 1 for monthly means at Elliott (0.9-1.7) and Forthside (0.7-2.7). For weekly catches at Stony Rise the ratio is 1.5 (0.8 to 2.3). For the annual catches the ratio is 0.63 at Elliott, 0.53 at Forthside and 0.84 at Stony Rise so that annual catches were most variable at Stony Rise.

Host records

For Norfolk Island, Holloway (1979) classified *D. intermixta* as a common forest resident which is abundant from October to January. There, it was also light-trapped in several non forest sites. Labels from 600 Tasmanian specimens held in the DPIW collection at New Town frequently indicate urban and agricultural habitats but also dry and wet eucalypt forest edges, montane wet eucalypt forest edges, *Nothofagus-Acacia* forest edges, coastal woodland edges, coastal heath and coastal saltflat. Chevron cutworm moths occur widely across Tasmania mostly at low altitudes but were occasionally trapped at up to 1000 m elevation.

Common (1990) said the larvae of chevron cutworm are polyphagous on herbaceous dicotyledons and seriously damage turnip (*Brassica rapa*, Brassicaceae) crops in Tasmania. He also listed capeweed, *Arctotheca calendula* (Asteraceae); white mustard, *Sinapis alba* (Brassicaceae); sugarbeet, *Beta vulgaris* (Chenopodiaceae); clover, *Trifolium* sp. (Fabaceae); and potato, *Solanum tuberosum* (Solanaceae) as host plants of chevron cutworm. Brown (1978) reported chevron cutworm attacking grass in NSW but in captivity reared it more successfully on an artificial diet than on grass. Dugdale (in Holloway, 1979) reported chevron cutworm larvae on nettle, *Urtica* sp. (Urticaceae) on Chatham Island.

Very few of the non-Tasmanian records in the Australian Plant Pest Database (http://www.planthealthaustralia.com.au) provided host plant data. These are for banana, *Musa paradisiaca* (Musaceae) and *Leptospermum* (Myrtaceae).

Between 1967 and 1986 Tasmanian state agricultural department entomologists reared chevron cutworm moths from larvae from about 48 infestations and reported the results in the Insect Pest Survey annual publications (Various multiple authors, for example Martyn *et al.*, 1971). The author reared larvae from 18 infestations between 1986 and 1989 as well as in 2005, a few of which were reported late in the Insect Pest Survey series.

These studies revealed that pest infestations occurred most frequently in brassica plants, namely turnip foliage and tubers; swede foliage and tubers, *Brassica napus*; rape, *Brassica napus*; cabbage, *Brassica oleraceae*; young cauliflower foliage, *Brassica oleraceae*; and brassica weeds in pea and cauliflower crops.

Less frequently recorded infestations were in amaranthus, *Amaranthus powellii* (Amaranthaceae) in a sweet corn crop; caraway stems, *Carum carvi*; carrot foliage, *Daucus carota* and parsley, *Petroselinum crispum* (Apiaceae); lettuce, *Latuca sativa* and variegated thistle, *Silybum marianum* (Asteraceae); horse-radish, *Cochlearia armoracia*; white mustard and kale or chou moellier, *Brassica oleraceae*, (Brassicaceae); hops, *Humulus lupulus* (Cannabaceae); chickweed, *Stellaria media* (Caryophyllaceae); red beet foliage and tubers, *Beta vulgaris* and sugarbeet foliage, *Beta vulgaris* (Chenopodiaceae); lucerne, *Medicago falcata*; clover, *Trifolium* sp., understorey to a maize crop; white clover, *Trifolium repens* and seed tick bean, *Vicia faba* (Fabaceae); musk storksbill, *Erodium moschatum* in sweet corn, carrot and broad bean crops; and pelargonium, *Pelargonium* sp. (Geraniaceae); blackcurrant foliage, *Ribes nigra* (Grossulariaceae); peppermint, *Mentha piperata* (Lamiaceae); seedling poppy, *Papaver somniferum* (Papaveraceae); sweet corn silks, *Zea mays*; maize, *Zea mays*; new pasture grass and dry grass under a blackcurrant crop (Poaceae); buckwheat, *Fagopyrum esculentum*, rhubarb, *Rheum rhabarbarum* and dock, *Rumex* sp. (Polygonaceae); polyanthus, *Primula polyantha* (Primulaceae); strawberry fruit and old foliage, *Fragaria ananassa*; apple fruit touching ground weeds, *Malus domestica* (Rosaceae); potato foliage, *Solanum tuberosum* (Solanaceae).

Infestations were most common (40%) in northwestern Tasmania with most of the remainder occurring equally between northeastern and southern Tasmania. There were few records from the Midlands and East Coast, which are drier agricultural areas.

About 80% of infestations occurred between March and July inclusive but a few infestations were recorded in all months except January and October.

Martyn et al., 1971 reported infestations of chevron cutworm were the worst for 25 years in forage crops and vegetables in spring, late autumn and early winter of 1969/70. These infestations often contained lesser numbers of a green cutworm, *N. nigerrima*.

Weeds, especially brassica weeds, are an important source of infestations in crops. Chevron cutworm damaged buckwheat foliage in several crops that were up to 1 m high. It also ate immature seed and incidentally dropped mature seed causing 50% seed loss. It was worst where wild turnip, *Brassica rapa* and charlock, *Sinapis arvensis* weeds were present in the buckwheat crops and in crops that followed forage turnips. Mature chevron cutworm contaminated harvested cauliflower curds destined for freezing when they sheltered from prolonged winter rain in several crops where weeds including chickweed were abundant. Larvae fed on sweet corn silks in summer crops where tall, heavily chewed *Amaranthus* weeds were present. Larvae also fed on *Erodium* weeds in sweet corn, carrot and broad bean crops in various seasons.

Chevron cutworm attack apple fruit only when it is touching weeds near the ground. Four such incidents occurring in April and May (1956-86) were recorded.

Chevron cutworms often occur with smaller numbers of one or two of the three pestiferous *Neumichtis* species. In seven of 17 infestations they occurred with *Neumichtis nigerrima* on lettuce, silverbeet, carrot, lucerne, sweet corn in a crop with tall *Amaranthus* weeds and in a domestic garden; with *Neumichtis spumigera* on peppermint and chickweed in cauliflower crops; and with both *N. nigerrima* and *N. saliaris* on turnip.

They also occur with other noctuid, geometrid and pierid species. For instance, with *Proteuxoa hypochalcis* (Turner, 1902) on chickweed in a garden; with *N. nigerrima* and the geometrid caterpillar, pasture day moth, *Ciampa arietaria* (Guenée, 1857) on brassica forage; with *N. spumigera* and *Athetis tenuis* (Butler, 1886) on potato; with native budworm, *Helicoverpa punctigera* (Wallengren, 1860) on musk storksbill in a corn crop; with the geometrid caterpillar, *Epyaxa subidaria* (Guenée, 1857) and a tortricid caterpillar on carrot; with brown cutworm, *Agrotis munda* Walker, 1857 on chou moellier and sugarbeet; with the pierid caterpillar, cabbage white butterfly, *Pieris rapae* (Linnaeus, 1758) on chou moellier.

Parasitoids

A rogadine braconid wasp parasitises chevron cutworm to emerge from intermediate instar caterpillars.

Conclusions

Despite a fast life cycle, high fecundity, broad host range and common occurrence in temperate urban and agricultural ecosystems chevron cutworm is only a minor agricultural pest in Tasmania and is not regarded as a pest in mainland Australia. Damage is greatest in the cool, wet months and in the moister regions of Tasmania. Brassica forage is the most frequently affected type of crop. Weeds, including but not restricted to brassica weeds, are important nursery plants for larvae in a variety of crops. The caterpillar is not an arboreal feeder but has damaged apple fruit when the fruit hangs low among weeds. Oviposition of domed eggs occurs on leafy substrates and is characteristically clustered. Chevron cutworm completes a life cycle rapidly in the laboratory at temperatures around 20°C and is easy to rear on an artificial bean-based diet. Nevertheless there is a summer gap of 20 weeks between the flight peaks of adults. Peaks of adult flight at Devonport suggest there may be three generations annually. The size of the late summer adult peak has little correlation with that of the preceding spring whereas other putative generational peaks correlate more strongly.

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A resurrected larval food plant for *Delias argenthona* (Fabricius) (Lepidoptera: Pieridae) in coastal, northern New South Wales, with review of associated literature

Kelvyn L. Dunn [1] & John T. Moss [2]
[1] e-mail: kelvyn_dunn@yahoo.com
[2] 30 Melaleuca Drive Capalaba Qld 4157

Summary

This paper supplies a field note stated as included in an earlier paper of the first author dealing with larval hosts of *Delias argenthona* (Fabricius), but accidentally omitted. The mistletoe, *Dendrophthoe vitellina* (F. Muell.) Tiegh (Loranthaceae) now represents a 'resurrected larval food plant' for this Jezebel butterfly, rather than its usage confirming two earlier, well-known, published reports as originally intended. The importance of host replications with supply of primary field details, as a measure of reliability for host or other life-history data in the literature, is emphasised. We review available knowledge in the literature and discuss several unpublished anecdotal reports. These comprise the bulk of evidence for this host association. Reports where a botanical specialist identified the larval hosts are more rigorous than those, where this component is unstated.

An omission from Dunn (1995) defaults to a new larval host for *D. argenthona*

Reported years earlier in two major collative works and based on independent field sources, the mistletoe, *Dendrophthoe vitellina* (F.Muell.) Tiegh remained undoubted as a host of the Northern Jezebel butterfly, *Delias argenthona* (Fabricius) for many years. Although deemed highly likely, Dunn sought out and found supplementary evidence of its usage in the McPherson region. In the summary of that paper, Dunn (1995: 73) had written that "confirmation" of *Delias argenthona* utilising *Dendrophthoe vitellina* was included. The paper intended to report the following supportive data:

> 'On 2 July 1995, I found an eclosed pupa of *Delias argenthona* on a leaf of *Dendrophthoe vitellina* (F. Muell.) Tiegh. The mistletoe was parasitising a *Melaleuca* sp. on Stotts Island, NSW (28°16S, 153°30E).'

Inadvertent omission of this information left the statement of 'confirmation' unsupported. Published evidence of its usage then fell into limbo.

Discussion

First evidence of this species as a larval host has origins in McCubbin (1971). He illustrated a *Delias* larva on a mistletoe labelled as "*Dendrophthoe vitellina*", which was parasitising *Melaleuca* (Myrtaceae). The habitat involved mangrove ecotone in an estuary at Cairns (McCubbin 1971: 116, pers. comm. 2004), which is consistent with that favoured by *Dendropthoe vitellina* (Barlow 1966). The larva appeared indistinct in the watercolour illustration, and so was not clearly identifiable on this evidence alone, in fact, resembling a different species (Dunn 1995). However, the accompanying description of the pupa (McCubbin 1971), which was "part of the same collection" (McCubbin pers. comm. 2004), confirmed the insect's identification.

Available host details created further circumstantial complications; *Dendrophthoe vitellina* and *Dendrophthoe glabresens* (Blakely) Barlow, are close sibling species with geographical contiguity (Barlow 1966). The mistletoe sprig illustrated by McCubbin (1971) was without flowers, suggesting it was not blossoming when he found the larvae. McCubbin (pers comm. 2004) had the mistletoe identified at the Melbourne Herbarium so it should have been trustworthy. However, the structure of the flowers remains important in distinguishing these siblings and these may not have been available in the preserved sample he submitted, potentially weakening the identification. Edging on the side of caution, McCubbin (pers. comm. 2004) has conceded to a measure of weakness in this aspect. Nonetheless, a primary report with host identification by a botanist, such as this one in McCubbin (1971), outweighs those where specialist identification was not sought. In their discussion of larval hosts, Common and Waterhouse (1981) elected not to cite, or overlooked the earlier record by McCubbin (1971). Later, Braby (2000) traced much of the food plant data of Australian butterflies but likewise did not cite this record, and supplied no replacement in order to retain the host plant, which suggests none was available to him. And yet, examples such as these of tacit exclusion or omission, taken as circumstantial evidence of others' doubt or suspicions remains dubious supposition in positivist science. (For reason of transparency and record tracing, it is vital for fact-gathers and reviewers to include appendices or separate publications outlining *all dismissed data* to distinguish such from accidental omissions, a literary process illuminative in such circumstances).

Back in 1995 when the first author investigated this host association, there existed another primary report. It too was common knowledge and accepted fact having appeared in the standard textbook of that era. Common and Waterhouse (1981: 282) recorded that "Near Coonabarabran, NSW [larvae] have been found on *Dendrophthoe vitellina* growing on Kurrajong, *Brachychiton populneum*", based on unpublished observations supplied by the late W.N.B. Quick (1928-2002). This record, obtained extemporaneously, gave no identifier. Aside from lacking rigour in this component, the inland locality and the host reported were factors suggestive of serious doubt. Indeed, Barlow (cited in Braby 2000: 340), an expert on the Loranthaceae, later discarded Nigel Quick's deputed record, stating that it is "almost certainly erroneous and probably refers to *D. glabrescens*".

In addition, Atkins (1993) made a third, but inferential report. Under the title of *Dendrophthoe vitellina*, he stated that "All coastal mistletoe-feeding butterflies [referring to the Newcastle area] utilise this species, with perhaps the exception of *Delias nysa*" (p.85). This must imply *D. argenthona* but without any source data, it is merely a statement of generality or belief, lacking specific evidence, and perhaps was inclusive of uncited literature. Even if based wholly on his experiential field knowledge, which its geographic prescription would imply, Atkins specified no identifier of the mistletoes listed. Obviously the writer is familiar with the local flora but if intended as a primary data contribution, consultation of a botanical expert would have raised the report's internal validity for this and the other butterfly species implicated as hosted. However, in fairness to this writer, this host usage was at that time, not considered in need of justification. Documented examples had earlier appeared in the two popular texts discussed above, so it is understandable that butterfly enthusiasts would not wish to add superfluity (albeit one host for *D. nigrina* was in fact new to science). Moreover, it would appear that the only other possible congener, *De. glabrescens* is not a coastal species in NSW (Moss 2004), and so non-specialist identification in this instance could be acceptable, as generic identification is not difficult. Atkins' host listing remains a statement of collector knowledge, albeit true, but unsupported by specifics. Most importantly, *D. argenthona* was not specifically named, so Braby (2000) could not include Atkins' record either, as it too could not stand alone as indisputable proof of usage due its deductive component. One or more other mentions in the anecdotal literature remain secondarily sourced. McLean (1993), for a period example, gave reference to Common and Waterhouse's dubious record of Quick's, specifying no primary evidence from the field himself.

Recapping the four main reports, McCubbin's record, although likely correct remains arguably weak (Dunn 1995). The information from Quick has been discredited (Braby 2000). Atkins (1993) was implicative of usage but required deductive assumption and was without specific details of circumstances, and the primary details in Dunn (1995) were found missing. In essence, there remained no trustworthy, published support. Hence, its exclusion at that time by Braby (2000) was unavoidable.

Other passing mentions in the popular literature have appeared since Braby (2000): Jordan (2000) and Miller (2004) are two such examples, but these are not evidential support for a stand-alone host record in scientific literature. The report by Jordan (2000) is merely a statement of generality, which reads, "The apostle mistletoe, *Dendropthoe* (sic.) *vittelina* (sic.) is the host for the beautiful Northern Jezabel's (sic.) caterpillars." (p.16). Miller (2004) similarly stated, "The local mistletoe foodplants include..." listing *De. vitellina* and five other hosts. Jordan (2000) and Miller (2004) did not include primary field details as evidence of association, being informative comments for lay readership, hinged on an assumption that such host knowledge is undisputed fact, having been carried through the literature since 1971. A brief mention by Moss (2004) sources an earlier edition of Moss (2005), so it too defaults to secondary literature.

Moss (2005: 46) has formally resurrected this mistletoe host association. He included it with nine other mistletoes utilised by this butterfly, in his regional food plant checklist. His sources, important in this instance where errors or inadequacies have surfaced in several earlier reports, were undisclosed in that compilation. The sources involved a dozen or so new observations supplied by local enthusiasts and his personal records from near Brisbane, Qld. These records listed below attest to its regular usage in south-eastern Queensland.

M. De Baar, for the first example, found instances in a Brisbane suburban garden at Corinda during the 1980s and 1990s where it was parasitising Crepe Myrtle (*Lagerstroemia indica*). G.R. Forbes reported his findings at Kenmore Hills and Chapel Hill west where the mistletoe infests *Callistemon* along residential nature strips. D. Bell gave instances of utilisation since the 1990s at Mitchelton (in Brisbane), where the mistletoe parasitises Brush Box, *Lophostemon confertus*. During the last decade, R. Kendall and the second author (JTM) discovered three occurrences of *D. argenthona* on *De. vitellina* parasitising Crepe Myrtle, *Callistemon* and *Nerium oleander* at Kenmore, Indooroopilly and Helidon, respectively. JTM also found several similar situations in the Redland shire; these mistletoes were parasitising Acacias, Crepe Myrtle, *Lophostemon* and Oleander. More recently, in Aug-Sep 2004, JTM, in company with botanist G. Leiper, found larvae on the western side of Fraser Island. The mistletoes were hosted by *Hibiscus tiliaceous* and *Eucalyptus/Corymbia* sp. Given that only the one species of *Dendrophthoe* occurs in greater Brisbane (Moss 2004), the requirement for herbarium identification to establish rigour becomes less critical.

North of Brisbane, G. Clemenson also reported to the second author instances of this association in a residential garden at Ningi Qld during the last ten years. Given *De. glabrescens* does not usually occur near the coast south of the Woodgate area of Queensland [Wide Bay region] (Moss 2004), the host identifications from Ningi would also seem decisive on this basis. Another overlooked and rigorous example is from the Sunshine coast. In this district, B. Orr (pers. comm. 2002) recorded *De. vitellina* as a major host in an ecological study undertaken at Caloundra in 1974-75. One published example from the Wide Bay region remains unclear. Dunn (1995) had reported usage of a *Dendrophthoe* sp. at Maryborough Qld. (identified by Barlow using vegetative characters as one of either *glabrescens* or *vitellina* from a flowerless sample of foliage collected in May 1993). Perhaps on geographic evidence and probability, the mistletoe might have been *vitellina*, but this area is not far south of Woodgate and some specimens of *glabrescens* may exist in sympatry in the modified environment of residential Maryborough or elsewhere. *De. glabrescens* (again identified by Barlow) occurs in open heath woodland at Burrum Heads Qld, as one example, where it was hosting *D. nigrina* (Dunn 1995). Biogeographical boundaries are ecological generalisations of occurrence rather than strictly delineative, with distributional blurring in 'buffer' zones often a field reality.

In quintessence, the available published data is of varied quality, most involve incomplete information and each is seriously weak in one or more aspects of rigour, rendering each a poor independent source. In their collective usage, most are inferentially or deductively supportive at best. Among the unpublished records provided above which tacitly supported Moss (2005), the information appears strong, with multiple data from the Brisbane area and Sunshine Coast, accumulatively creative of rigour. To these, the first author's omitted record from 'Stotts Island' evinces that *De. vitellina* is utilised by *D. argenthona* in northern coastal NSW. The presence of a pupa – the larvae usually pupate on the host (Braby 2000) – and absence of any other mistletoe on the tree infers this as the larval host beyond reasonable doubt. Importantly, an expert had identified the host mistletoe, adding to its internal validity. Evidently, many field workers hold experiential knowledge of its common usage in southern Queensland, but perhaps did not publish or relay this information to Braby because they reasonably believed it to be redundant. As others publish detailed reports from more northern localities reinforced with authoritative host identifications, the evidence supporting the spatial utilisation of this mistletoe by *D. argenthona* will strengthen over time.

Conclusion

De. vitellina is a common larval host of *D. argenthona* in coastal areas of both NSW and Queensland. Known to butterfly enthusiasts and collectors for a lengthy period, it has escaped regular documentation. The brief removal of this host from the accumulative literature (*viz.* Braby 2000) has emphasised the need for published replications to buffer changes in knowledge. Fact reinforcements will similarly counter losses where one or more cornerstone pieces may prove spurious, weak or inadmissible as new facts arise or with changes in botanical taxonomy.

Acknowledgements

Firstly, we thank Charles McCubbin (Victoria) for background information on his published account. Secondly, some conclusions would not have been clear had it not been for the field efforts and provision of the unpublished observations of colleagues in south-eastern Queensland (each being individually mentioned in the text). We also acknowledge the contributions of other authors (as referenced) to the elucidation of this butterfly/host plant association. Finally, special thanks to Dr Brian Barlow (CSIRO, Canberra) for his past mistletoe identifications provided to KLD from 1983-95.

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Some Notes on Stirling Range Populations of *Ogyris oroetes apiculata* Quick (Lepidoptera: Lycaenidae)

Daniel King, 420 Spencer Road, Thornlie, Western Australia 6108.
email: drd_king@hotmail.com or ventnor1@dodo.com.au

Introduction

In south-west Western Australia, the Silky Azure butterfly (*Ogyris oroetes apiculata* Quick) is surprisingly elusive. Braby (2000) has its range extending over a wide area of south-west Western Australia; yet comparatively few captures are documented in Dunn and Dunn (2006). There are 16 in "Leeuwin", Dunn and Dunn's terminology for an area that includes the Stirling Ranges; 16 in "Bencubbin", a more northerly part of south-west Western Australia; and 3 in "Esperance", a self-explanatory term. But the situation with regard to *O. oroetes* is noteworthy for another reason: while Braby (2000) lists both spring and autumn as flight times for the Silky Azure, my observations and those of other collectors suggest that in the Stirling Ranges the butterflies fly exclusively in autumn. If these observations are an accurate reflection of reality (and there is no reason to believe that they are not) one possibility (*pace* Grund) is that *O. oroetes* eggs diapause. This could be the result of a genetic variation prompted by, perhaps, isolation of the population; or it may simply be a characteristic that arose and has become reinforced by chance. In this paper I propose - given that there is much important unpublished material in private hands - to provide data and notes of a number of lepidopterists with whom I have communicated, if only to provide guidelines for future research.

Earlier Unpublished Data

Hay and Bollam have made a particularly important contribution to our knowledge of the Silky Azure; so I present their data first. (In private correspondence Hay indicated that much of his collection work was done jointly with Bollam; I communicated with Hay via letter and with Bollam via telephone.)

Hay described to me a site near the Stirling Ranges caravan park, in Chester Pass Road, where "eucalypts [were] absolutely covered by mistletoes - some huge clumps cascading almost to the ground". (The mistletoes, presumably, were *Amyema miquelii*, as in a nearby *oroetes* site I found, close to Paper Collar Creek). Confusingly, Hay initially described his visits to the site (there was more than one, over the years) as taking place in November; however, after consulting his and Bollam's specimen-labels he amended the visiting times to late February/March. Indeed, a trip by Hay to the site in November, the purpose of which was to demonstrate the existence of the population to Matt Williams, failed to show any *oroetes*, although Williams found a larva at a site close to the Stirling Ranges in early November 1993. In a personal communication, Williams says of this larva that it was collected under bark, and that the site was "off Salt River Road, on the route from Cranbrook to the Stirlings". Similarly, Geoff Walker informed me in a personal communication that "Grant Miller, Steve Brown and Richard Weir looked [in] early November and found only eggs".

Recent Data

When I contacted Hay about possible *O. oroetes* sites, he warned me that his site had not, to his knowledge, been visited for at least ten years. He gave me directions as to how to reach the site, but sadly these proved inadequate. However, on March 17 2006 I found a site several kilometres along Chester Pass Road, on the way to Borden, just near Paper Collar Creek, with a very noticeable infestation of *Amyema miquelii*. Around one o'clock in the afternoon *Ogyris* were very much in evidence: at one point I observed seven in flight at the same time. They flew much higher than is typical of *Ogyris amaryllis*; and after about an hour I captured a male, in undamaged condition, which proved to be *Ogyris oroetes*. It was a deep purplish blue, much darker than the bright shining blue of *O. amaryllis*, and with the characteristic thick black margins on the forewings. My attempts to capture further specimens were unsuccessful on this occasion; but the following March I caught two specimens of *O. oroetes* in rapid succession: a female in almost undamaged condition, and a male with some tears to the rear wings but otherwise fresh in appearance. Fewer butterflies were observed this time: I attributed this exiguity to the death of the large eucalypt (and its mistletoe) that had been the focus of their activity the previous year.

I intended to visit the Paper Collar Creek site in spring, to ascertain whether *O. oroetes* were also present at that time; learning, however, that Geoff Walker wished to study the Silky Azure in the Stirlings, I told him of the Paper Collar Creek site. Walker consequently visited the site, and emailed me the following observations:

> My experience at Paper Collar Creek began shortly after noon on the 2nd November 2006. Upon arrival at the site I was immediately aware of many *Ogyris* butterflies careering around the mistletoe and surrounding trees. After catching two and observing a further 20 over 2-3 hours over two days, through my 10x50 Zeiss binoculars. . . my impression was that all were *Ogyris amaryllis*.

Like the observations of Hay, Bollam, Miller, Brown, Weir, Matt Williams, and myself, then, Walker's observations are consistent with the hypothesis that Stirling Range *Ogyris oroetes* fly only in the autumn.

Discussion

Dunn and Dunn (2006) indicate that while there are no recorded spring captures of *Ogyris oroetes* from the Stirlings, there have been - as previously mentioned - 3 from the "Esperance" district and 16 from "Bencubbin". (But as the map in this book shows, the nearest capture-sites to those in the Stirlings are several hundred kilometres away.) Further, in private correspondence Walker provided information of a specimen, raised by David Landy, bearing the label "The Humps Hyden W A December 23 1978 D F Crosby bred". The site of Hyden is noteworthy, because it is roughly equidistant between the Stirlings and Queen Victoria Spring, where Andy Williams et al (1997) observed and caught *O. oroetes* (in the autumn; so far as I am aware, it is not known whether *O. oroetes* flies at Queen Victoria Spring also vernally).

One point perhaps needs to be underlined here: the issue is not just why *Ogyris oroetes* appears to fly only in autumn at Stirling Ranges sites such as Paper Collar Creek, but also why *Ogyris amaryllis* appears to fly only in spring at this site. On the way to the Stirlings in autumn, *Ogyris amaryllis* was certainly in evidence on other *Amyema miquelii* infestations: I collected a specimen at Arthur River, for example.

It is premature to speculate as to causal mechanisms for the Stirling Range *oroetes*' autumnal flying time. That the eggs diapause as a way of coping with winter cold (snow has been recorded in the Stirlings) can probably be ruled out; for while Grund (2006) classifies the Silky Azure as a "tropical to subtropical butterfly", he informed me in an email that this classification is based on considerations of latitude only. Further (he indicated) *Ogyris oroetes* has also been collected in the Flinders Ranges, where snow has similarly been recorded - and unlike the case with the Stirlings, specimens of *Ogyris oroetes* have been collected at this location in the spring - as Dunn and Dunn (2006) illustrate. Grund (2006) adds that the butterfly "is unable to tolerate continuous cold temperatures"; but this statement is of questionable value, because it is not clear what "continuous" is supposed to mean. (In a literal sense, no part of Australia except for the Australian Antarctic Territory experiences continuous cold temperatures.)

Conclusion

The Stirling Range *Ogyris oroetes* populations are clearly distinct in at least one way - flight time - from other populations. Given that Braby (2006) already uses the word "tentatively" whilst discussing the taxonomy of this insect, the ideal situation would be for specimens to be DNA sequenced. Then we should perhaps know to what extent the Stirling Range populations are in the process of differentiating from other populations. Until then, further observations are obviously desirable.

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Note to Kelvyn L. Dunn's "An Extension to the Known Distribution of *Eurema alitha* (C. Felder & R. Felder) into South-Eastern Queensland (Lepidoptera: Pieridae) "

by

Daniel King, Ph.D

A single specimen of *Eurema alitha* (C. Felder & R. Felder) was collected by the author on the 15th of June 2004 in Urangan (Hervey Bay). The capture was in coastal parkland; specimens of *Eurema hecabe* were collected at the same time. The individual was in undamaged condition.

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Dunn, K.L. 2007. An Extension to the Known Distribution of *Eurema alitha* (C. Felder & R. Felder) into South-Eastern Queensland (Lepidoptera: Pieridae). *Vict. Ent.* 37(4): 58-61.

420 Spencer Road
Thornlie
Western Australia 6108.
email: drd_king@hotmail.com or ventnor1@dodo.com.au

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IMMEDIATE PAST PRESIDENT:	*David Stewart* P.O. Box 2152, Rosebud Plaza, 3939. ph. 0419 875 977 dstewa27@optusnet.com.au
WEBMASTER:	*Daniel Dobrosak*, 66 Wiltonvale Avenue, Hoppers Crossing, 3029. ph 9695 6577 (BH) ph 9749 1476 (AH). editor@entsocvic.org.au
COUNCILLORS:	*Dr. Ken Walker*

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The Society welcomes contributions of articles, papers or notes pertaining to any aspect of entomology for publication in this Bulletin. Contributions are not restricted to members but are invited from all who have an interest. Material submitted should be responsible and original. The Editor reserves the right to have articles refereed. Statements and opinions expressed are the responsibility of the respective authors and do not necessarily reflect the policies of the Society.

Contributions may be typed on A4 paper or sent to the Hon. editor on an IBM formatted disk in ***Microsoft Word for Windows*** with an enclosed hard copy. The main text of the news bulletin is prepared in 8 point, *Book Antiqua* font (please do not use fixed point paragraph spacing). Contributions may *preferably* be E-mailed to Internet address: editor@entsocvic.org.au

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